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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/708,912

03/31/2004

Kiran V. Chatty

BUR920030180US1

2911

29154

7590

12/13/2005

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EXAMINER

PHAM, THANHHA S

ART UNIT

PAPER NUMBER

2813

DATE MAILED: 12/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/708,912

Applicant(s)

CHATTY ET AL.

Examiner

Thanhha Pham

Art Unit

2813

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 14 June 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 17-20 is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☒ Claim(s) 14-16 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 March 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>6/14/2005</u> | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Oath/Declaration*

1. Oath/Declaration filed on 03/31/2004 has been considered.

### *Claim Objections*

2. **Claim 4 is objected to because of informalities.**

Line 3, "said second edge" should be changed to --a second edge-- for clarifying the scope of the claim

Appropriate correction is required.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. **Claims 1-2 and 5-9 are rejected under 35 U.S.C. 102(b) as being anticipated by Krivokapic [US 6,294,412].**

► With respect to claim 1, Krivokapic (figs. 12-22, cols. 5-7) discloses a method of forming a non-gated silicon on insulator diode in a semiconductor substrate (60, 64, 70), the substrate including a plurality of isolation regions (72) formed therein, said method comprising:

forming a first structure (83, 92) on an upper surface of said substrate in a region between at least one pair of said isolation regions (see fig. 14);

forming a first region (94) of a first dopant type in said substrate, said first region comprising a first edge aligned to a first edge of said first structure (see fig. 16); and

removing said first structure (83, 92) (see fig. 22).

► With respect to claim 2, Krivokapic (fig. 16) discloses forming a second region (94) of a second dopant type in said substrate, the second region comprising a second edge aligned to a second edge of said first structure. **\*\*Notice:** as interpreting the claim in a broad scope, the first dopant type can also be the same as the second dopant type because the claim does not distinct the first and second dopant type.

► With respect to claims 5-6, Krivokapic (col. 6, lines 45-46) discloses that first structure comprises a hard mask of silicon nitride layer (83).

► With respect to claim 7, Krivokapic (col. 6, lines 45-46) discloses that first structure comprises a gate (83).

► With respect to claim 8, Krivokapic (fig. 14) discloses that first structure comprises insulating spacers (92).

► With respect to claim 9, Krivokapic (fig. 19) discloses that wherein in said removing step, said spacers (92) remain on said substrate.

► With respect to claim 10, Krivokapic (figs. 12-22, cols. 5-7) discloses a method of forming a self-aligned SOI diode, said method comprising:

depositing a protective structure (92) on an upper surface of said substrate in a region between at least one pair of said isolation regions (see fig. 14);

implanting a plurality of diffusion regions of variable dopant types in an area between at least one pair of isolation regions in substrate (figs 15-21), said plurality of diffusion regions separated by diode junction, wherein said implanting aligns an upper surface of said diode junction with said protective structure (92)

removing said protective structure (92) (see fig. 22).

► With respect to claim 12, Krivokapic (col. 6, lines 45-46) discloses that the protective structure comprises a hard mask (silicon oxide).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**4. Claims 3-4 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krivokapic [US 6,294,412] in view of Applicant Admitted Prior Art (fig. 1, text [0005]).**

► With respect to claims 3-4, Krivokapic substantially discloses the claimed method except forming first and second silicide layer comprising first and second silicide edge aligned to said first and second edge of said first structure respectively. However, Applicant Admitted Prior Art discloses forming first and second silicide layer (35) comprising first and second silicide edge aligned to said first and second edge of said first structure (30, 40) respectively (fig. 1, text [0005]). Therefore, at the time of the

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invention, it would have been obvious to one having skill in the art to modify process of Krivokapic by forming the first and second silicide layer on the first and second region as taught by Applicant Admitted to provide the known purpose of reducing contact resistance of the first and second region for the device.

► With respect to claim 11, Krivokapic substantially discloses the claimed method except forming a silicide layer aligned with said protective structure. However, Applicant Admitted Prior Art discloses forming a silicide layer (35) aligned with said protective structure (30, 40, fig. 1, text [0005]). Therefore, at the time of the invention, it would have been obvious to one having skill in the art to modify process of Krivokapic by forming the silicide layer aligned with said protective structure as taught by Applicant Admitted to provide the known purpose of reducing contact resistance of the device.

► With respect to claim 13, Krivokapic substantially discloses said protective structure comprises a hard mask/sidewall spacer of silicon oxide. Krivokapic does not expressly teach said hard mask comprises silicon nitride. However, it has been known in the art that silicon nitride and silicon oxide are known materials for hard mask/sidewall spacer. Selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945) "Reading a list and selecting a known compound to meet known requirements is no more ingenious than selecting the last piece to put in the last opening in a jig-saw puzzle." 325 U.S. at 335, 65 USPQ at 301. See also *In re Leshin*, 227 F.2d 197, 125 USPQ 416 (CCPA 1960)

(selection of a known plastic to make a container of a type made of plastics prior to the invention was held to be obvious).

***Allowable Subject Matter***

5. Claims 17-20 allowed.
6. Claims 14-16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
7. The following is an examiner's statement of reasons for allowance:
  - Recorded Prior Art also fails to disclose or suggest combination of process steps of forming a self-aligned silicon over insulator diode as cited in claim 17 including: configuring a gate over said implant region; configuring a pair of sidewall spaces on sides of said gate; using said gate to define P+ and N+ contact regions in said implant region; removing said gate and using said sidewall spacers to align a silicide layer over said P+ and N+ contact regions.
  - Recorded Prior Art fails to disclose or suggest the combination of the process steps as recited in the base claim 10 including wherein said protective structure comprises a polysilicon gate as characteristics in claim 14.

***Conclusion***

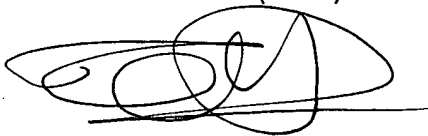
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanhha Pham whose telephone number is (571) 272-

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1696. The examiner can normally be reached on Monday and Thursday 9:00AM - 9:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, consisting of several loops and a horizontal line at the bottom.

Thanhha Pham  
Patent Examiner



6/14/05

## ELECTRONIC INFORMATION DISCLOSURE STATEMENT

Electronic Version v18

Stylesheet Version v18.0

<b>Title of Invention</b>	<b>METHOD FOR CREATING A SELF-ALIGNED SOI DIODE BY REMOVING A POLYSILICON GATE DURING PROCESSING</b>
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Application Number : 10/708912  
Confirmation Number: 2911  
First Named Applicant: Kiran Chatty  
Attorney Docket Number: BUR920030180US1



Art Unit:

Examiner:

Search string: ( 5629544 or 5811857 or 6232163 or 6245600 or 6589823 or 6576958 or 6590264 or 20020119608 or 20030080386 ).pn

### US Patent Documents

Note: Applicant is not required to submit a paper copy of cited US Patent Documents

init	Cite.No.	Patent No.	Date	Patentee	Kind	Class	Subclass
TS	1	5629544	1997-05-13	Voldman, et al			
1	2	5811857	1998-09-22	Assaderaghi, et al			
	3	6232163	2001-05-15	Voldman, et al			
	4	6245600	2001-06-12	Geissler, et al			
	5	6589823	2003-07-08	Beebe, et al			
✓	6	6576958	2003-06-10	Ker, et al			
TS	7	6590264	2003-07-08	Ker, et al			

### US Published Applications

Note: Applicant is not required to submit a paper copy of cited US Published Applications

init	Cite.No.	Pub. No.	Date	Applicant	Kind	Class	Subclass
TS	1	20020119608	2002-08-29	Ko, et al			
TS	2	20030080386	2003-05-01	Ker, et al			

### Signature

Examiner Name	Date
	12/11/05

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